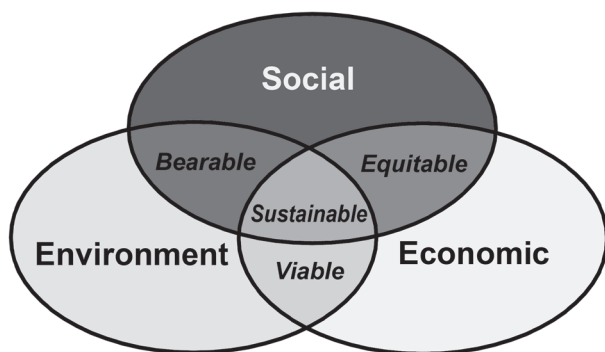


Army Sustainability and Leadership in Energy and Environmental Design

By Mrs. Rebecca C. Wingfield

Sustainability is one of the newest Army buzzwords. You may ask then, “What is sustainability?” The word *sustain* is of Latin origin, and sustainability is the capacity to uphold, maintain, or endure.¹ However, in the last several years the term has taken on a life of its own, and its meaning has changed from simple to highly complex. In the figure below, concentric circles represent the “Three Pillars of Sustainability” and their interconnections.² If you were to ask most people what sustainability is about, you might get answers concerning the state of the stock market, the housing market, agriculture, marriage and the family, or the earth’s ecosystems and how human activities are destroying our planet—all of which describe the capacity of certain aspects of our culture or society to endure. Although none of these answers are wrong, they don’t quite get to the Army perspective.

Three Pillars of Sustainability



Sustainable Practices

Armey Sustainability, as defined in the 2010 Army Posture Statement, is—

“ . . . a program to accelerate transition from the Army’s traditional, compliance-based approach in environmental stewardship to a mission-oriented, systems-based approach. Army Sustainability objectives are to meet current and future mission requirements worldwide, safeguard human health, improve quality of life, and enhance the natural environment. Sustainable practices improve our ability to organize, equip, train, and deploy our Soldiers as part of the joint force today and into the future. In the context of the new Army Sustainability Campaign Plan, sustainability involves—

- *Developing, producing, fielding, and sustaining materiel that is more energy efficient, capable of using renewable energy resources, reduces the use of hazardous materials, and generates less waste.*
- *Ensuring that the Army has sufficient access to training and testing resources, by incorporating sustainability into operational planning and execution so that the Army can continue to effectively train today and in perpetuity.*
- *Instilling sustainable practices in all levels of our Soldier and civilian education programs.*
- *Providing services and operating facilities in a manner that reduces consumption of resources, promotes the use of renewable energy sources, enhances quality of life, and continues to protect the environment.”³*

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Apartment-style living with parking, dumpster, and gazebo

Sustainable Design and Development

This article focuses primarily on the fourth bullet of the Army Posture Statement on Army Sustainability. In 2001, the U.S. government determined that any new government facility would be environmentally friendly and sustainable. The Sustainable Project Rating Tool (SPiRiT) was created and used to design and rate projects for sustainable design and development (SDD) by the United States Army Corps of Engineers (USACE). The Office of the Assistant Secretary of the Army (Installations and Housing) announced in January 2006 that the Army would transition from its SPiRiT rating system to Leadership in Energy and Environmental Design (LEED) for all new construction projects, regardless of funding source:

“LEED buildings demonstrate better life cycle economic performance than conventional construction, use less energy and water, and have a smaller environmental footprint. According to the U.S. Green Building Council (USGBC), the Federal Government, the nation’s largest building owner, has been among the top users of the U.S. Green Building Council’s LEED rating system, and has also helped to develop and improve the rating system through participation in USGBC member committees.”⁴

The United States Army, as a proponent for LEED in this country, is a member of the USGBC, which promotes use of the LEED rating system and “green” building practices through its LEED certification program. LEED has become the industry standard for SDD and is used to certify buildings and structures as environmentally friendly systems.

The Energy Policy Act of 2005 and, most recently, the Energy Independence Security Act of 2007 (EISA 2007) require that SDD practices be used not only to introduce energy efficiency into systems and structures but also to require energy-use reductions.⁵ Since 2007, all U.S.

government structures built in the continental United States require third-party certification of performance energy standards for new government buildings—a requirement of the EISA 2007. In its Section 433, performance energy efficiency standards specified by the Department of Energy state that *“the buildings shall be designed so that the fossil fuel-generated energy consumption of the buildings is reduced, as compared with such energy consumption by a similar building in fiscal year 2003 (as measured by Commercial Buildings Energy Consumption Survey or Residential Energy Consumption Survey data from the Energy Information Agency), by the percentage specified in the following table:*

| Percentage Reduction | By Year |
|----------------------|---------|
| 55 | 2010 |
| 65 | 2015 |
| 80 | 2020 |
| 90 | 2025 |
| 100 | 2030 |

Section 433 also requires that sustainable design principles be applied to the siting, design, and construction of buildings subject to the standards.”⁶

According to EISA 2007, Section 433, a *“certification system and level for green buildings shall be identified by DOE [Department of Energy] in consultation with the Department of Defense (DOD) and GSA [Government Services Administration] based on Director of Federal High-Performance Green Buildings ([part of] GSA) findings.”⁷*

USGBC is the third-party certification agent, and LEED is the certification rating system used.

LEED Rating System

LEED provides a complete framework for assessing building performance and meeting sustainability goals. The minimum certification level to be achieved for federal buildings is LEED Silver—the second of four ratings: Certified (40–49 points), Silver (50–59 points), Gold (60–79 points), and Platinum (80–100 points). Projects must achieve all the prerequisites and a minimum of 50 percent of the available points to be awarded LEED Silver certification. The allocation of points between credits is based on the potential environmental impacts and human benefits of each credit. The impacts and benefits are defined as the environmental or human effect of the design; construction; and operation and maintenance of the building (which include greenhouse gas emissions, fossil fuel use, toxins and carcinogens, air and water pollutants, and indoor environmental conditions). To earn LEED certification, the applicant project must meet requirements for all the prerequisites and credits worth the minimum number of points to earn the desired project rating. The LEED rating system is based on well-founded scientific standards, emphasizing state-of-the-art strategies for the following credit categories—which show the number of prerequisites, the number of credits, and the number of points possible to be earned per credit. Project points to be compiled are 100 base points and 10 bonus points, for a grand total of 110 points in these categories:

Sustainable Sites prerequisites (2) and credits (10) section focuses on environmental concerns related to the project landscape, the project hardscape (paved areas), and

the exterior of the building—specifically, protection of open habitat; snow and ice removal; paints and sealants used on the building exterior surfaces; alternate methods of transportation (to reduce the need for automobile parking); and green roofs. (26 points possible)

Water Efficiency prerequisites (1) and credits (4) section focuses on environmental concerns related to the use and disposal of water in the project—for example, water-efficient landscaping; reduced-flow plumbing fixtures; and cooling tower water management. (6–10 points possible)

Energy and Atmosphere prerequisites (3) and credits (6) section focuses on building energy performance, as shown by modeling; managing refrigerants to eliminate CFCs; and using renewable energy. (11–35 points possible)

Materials and Resources prerequisites (1) and credits (6) section focuses on environmental impact of materials brought into the project (materials selection) and the minimization of landfill and incinerator disposal for materials that leave the project (waste reduction and disposal). (8–14 points possible)

Indoor Environmental Quality prerequisites (3) and credits (10) section focuses on occupants' health, safety, and comfort; energy consumption; air change effectiveness; and air contaminant management. (15 points possible)

Innovation in Design credits section focuses on use of new technologies and up-to-date research to introduce cutting-edge techniques into the green building industry. (6 points possible)

Regional Priorities credits section focuses on solutions unique to the region's environmental concerns. (4 points possible)⁸



Kitchen, showing tile floors, solid countertops, stackable high-efficiency washer and dryer, microwave oven, refrigerator, and dining counter for Soldiers

All members of DOD should support LEED certification use and advocate for it at their installations and facilities. LEED, by its very nature, supports Army sustainability goals, as shown in Executive Order (EO) 13514, issued in October 2009:

“Section 1. Policy. In order to create a clean energy economy that will increase our Nation’s prosperity, promote energy security, protect the interests of taxpayers, and safeguard the health of our environment, the Federal Government must lead by example. It is therefore the policy of the United States that Federal agencies shall increase energy efficiency; measure, report, and reduce their greenhouse gas emissions from direct and indirect activities; conserve and protect water resources through efficiency, reuse, and stormwater management; eliminate waste, recycle, and prevent pollution; leverage agency acquisitions to foster markets for sustainable technologies and environmentally preferable materials, products, and services; design, construct, maintain, and operate high performance sustainable buildings in sustainable locations; strengthen the vitality and livability of the communities in which Federal facilities are located; and inform Federal employees about and involve them in the achievement of these goals.” (Emphasis added.)

This EO has set as policy **sustainability** in our building infrastructure. All of the above emphasized statements were implemented in *LEED 2009 for New Construction and Major Renovations*, the reference guidebook for the updated LEED rating system. Constructing more sustainable Army infrastructure allows for availability of more resources in support of the mission, Soldiers, and their families.

Another beneficial attribute of LEED buildings is that, in many cases, they are more comfortable to work and live in. LEED buildings often feature natural lighting, increased ventilation, and low volatile organic compounds (VOCs) in construction materials—all contributing to more comfort for inhabitants and producing less illness due to indoor air pollution. VOCs are the toxic compounds often found in many paints, glues, and solvents commonly used in building construction products and some industrial cleaners. In general, when people work in a sustainable building, greater productivity is the result, which leads to cost savings.

Sustainable Army Infrastructure

An excellent example of a LEED project at Fort Leonard Wood, Missouri, is the Permanent Party Barracks project, constructed by S. M. Wilson for USACE and completed in April 2010. The project was phase 3 of a 5-phase plan for permanent-party, single-Soldiers’ barracks. This phase 3 project is expected to receive LEED Gold certification and was turned over to the Army ahead



Recharging outlets for electric cars, preferred parking place, and stairs to entrance of 2d floor quarters

of schedule to allow redeploying Soldiers to move directly into these new quarters.

The buildings feature five apartment-style units per building. Each barracks unit has space for two Soldiers, except for the senior noncommissioned officer’s (NCO’s) quarters that are set up for the individual NCO. The second bedroom area in the NCO’s quarters is furnished as a living room. The remaining four barracks units have two private bedrooms, each with a closet and a vanity. The Soldiers share a bathroom, the kitchen, and laundry. Kitchens include solid countertops; microwave ovens; full-size Energy Star-rated refrigerators; and a stacked, high-efficiency washer and dryer. There is one parking place per bedroom, which allows Soldiers to keep their vehicles clean, secure, and close to their quarters. This project also implemented preferred parking for two energy-efficient vehicles, with a power outlet for electric charges. The project features multiple basketball courts, volleyball courts, horseshoe pits, and a walking trail for physical fitness.

Excellent facilities like these can help increase retention rates and provide a higher quality of life for Soldiers, while increasing sustainability of our forces—which is one of the goals of the Army Posture Statement. Higher retention rates mean that fewer resources will have to be expended to keep the Army at a high rate of readiness in trained personnel. Showing Soldiers that they are valued members of the Army—a resource that the Army cannot do without—by providing them with high-quality, comfortable living quarters should mean that the Army will not have to work as hard to retain its forces.

Reducing the Footprint

Other sustainable strategies that DOD and the Army have implemented are policies such as buying green products for cleaning and promoting telework or telecommuting for those people whose jobs qualify




Horseshoe pits, volleyball courts, and basketball courts

for the plan. The telework strategy provides for approximately 20 percent of the workforce to use alternative work sites (for example, the home) at any one point in time.¹⁰ This is an innovative way to diminish the infrastructure footprint of DOD, which can reduce—

- Energy costs in buildings, if they can be smaller.
- Number of employees commuting.
- Automobile emissions.
- Air pollution.
- Automobile accidents during inclement weather.

Not all agencies have employees who can telework, but agencies that do can provide a significant cost savings.¹¹

The four goals of Army sustainability cover the functions of the Army and require members of the Army team to provide and improve innovative ways to increase the sustainability of the Army. If we stay open-minded to innovation, we can solve many of our sustainability goals. 

Mrs. Wingfield is a civil engineer working for the United States Army Engineer School at Fort Leonard Wood, Missouri, in the Directorate of Environmental Integration. She previously spent 13 months working for the United States Army Corps of Engineers as a project engineer stationed in Basra, Iraq, and at Contingency Operations Base Adder near Nasiriyah, Iraq. She has also worked at Fort McClellan, Alabama; for the Department of Defense schools in the Federal Republic of Germany; and for the state of Illinois. She holds a bachelor's in civil engineering from the University of Missouri–Rolla (now Missouri University of Science and Technology). In January 2009, she was awarded LEED–AP BD+C accreditation (Leadership in Energy and Environmental Design–Accredited Professional in Building Design and Construction) by the United States Green Building Council, of which the United States Army is one of the leading members.

Endnotes

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²“Sustainability,” <<http://en.wikipedia.org/wiki/Sustainability>>; W. M. Adams, “The Three Pillars of Sustainability,” *The Future of Sustainability: Re-thinking Environment and Development in the Twenty-first Century*. The World Conservation Union Report of the International Union for Conservation of Nature (IUCN) Renowned Thinkers Meeting, 29–31 January 2006, <<http://www.iucn.org>>, accessed 22 April 2010.

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⁵Energy Policy Act of 2005, <www.epa.gov/oust/fedlaws/publ_109-058.pdf>, accessed 26 April 2010.

⁶Energy Independence and Security Act of 2007, Public Law 110-140, <<http://www1.eere.energy.gov/femp/regulations/eisa.html>>, accessed 22 April 2010.

⁷Ibid.

⁸LEED 2009 New Construction and Major Renovations, 2009, USGBC, <www.usgbc.org>, accessed 26 April 2010.

⁹EO 13514, 5 October 2009, <<http://www1.eere.energy.gov/femp/regulations/eo13514.html>>, accessed 27 April 2010.

¹⁰DOD Instruction 1035.01, *Telework Policy*, 3 April 2007.

¹¹Department of the Army TRADOC Regulation 600-18, *TRADOC Guidance for the Department of Defense Telework Policy*, 21 July 2004.